



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,389	07/20/2005	Satoshi Takei	124418	2689
25944	7590	09/25/2006	EXAMINER	
OLIFF & BERRIDGE, PLC			CHOI, LING SIU	
P.O. BOX 19928			ART UNIT	PAPER NUMBER
ALEXANDRIA, VA 22320			1713	

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/540,389

Applicant(s)

TAKEI ET AL.

Examiner

Ling-Siu Choi

Art Unit

1713

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>07/20/2005</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Claims 1-13 are now pending, wherein claims 1-11 are drawn to a gap fill material forming composition; claim 12 is drawn to a method to form a gap fill material layer for use in manufacture of semiconductor device; claim 13 is drawn to a gap fill material layer.

### ***Claim Objections***

2. Claims 1-13 are objected to because of the following informalities: (a) Claim 1, line 1, "composition characterized in that" is suggested to be changed to --composition, wherein-- and (b) Claim 7, line 2, "the polymer is a dextrin ester compound" is suggested to be changed to --the polymer is a dextrin ester--.

Appropriate correction is required.

### ***Claim Analysis***

3. Summary of Claim 1:

Art Unit: 1713

a gap fill material forming composition comprising	
A	a polymer having a hydroxy group or a carboxy group
B	a crosslinking agent
wherein the composition is used in semiconductor device by a method comprising	
1	coating a photoresist on a substrate having a hole with aspect ratio shown in height/diameter of 1 or more
2	transferring an image to the substrate by use of lithography process
with the composition being coated on the substrate prior to coating of the photoresist	

Summary of Claim 13:

A gap fill material layer manufactured by	
A	coating the gap fill material forming composition <u>according to claim 1</u> on a semiconductor substrate
B	baking it,
in which the gap fill material layer has a dissolution rate of from 3-200 nm per second for an alkaline aqueous solution having a concentration of 0.1-20%	

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Art Unit: 1713

5. Claims 1-2 and 4-13 rejected under 35 U.S.C. 102(b) as being anticipated by Rutter et al. (EP 1 150 343 A2).

Rutter et al. disclose a composition comprising one or more crosslinkable polymers having a weight average molecular weight of less than or equal to about 8,000, wherein the crosslinkable polymer comprises at least one hydroxyl group containing monomer, wherein the crosslinker includes di-, tri-, tetra, or higher multi-functional ethylenically unsaturated monomer; the hydroxy group containing monomer is aliphatic or aromatic, which is vinyl phenol, vinyl cresol, vinyl methoxy phenol, hydroxyethyl (meth)acrylate, 2-hydroxypropyl (meth)acrylate, 3-hydroxypropyl (meth)acrylate, hydroxycyclohexyl (meth)acrylate, hydroxyphenyl (met)acrylate, di-ethyleneglycol (meth)acrylate....hydroxyethyl itaconate ([0027]; [0043]; claim 1). Rutter et al. further disclose that the composition comprises acid catalyst which includes free acid and acid generator. Rutter et al. furthermore disclose the composition provides substantially planarized surface in the manufacture of electronic devices and can function as an antireflective coating for 193 nm radiation when the composition contains aromatic group (abstract; [0062]). Thus, the present claims are anticipated by the disclosure of Rutter et al.

6. Claims 1-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Takei et al. (EP 1 315 045 A1).

Takei et al. disclose a composition for forming a gap-filling material to be used in a semiconductor device by a method of applying the composition to the substrate with

Art Unit: 1713

holes having an aspect ratio of at least 1 to planarize the surface of the substrate; then applying a resist coating onto a substrate; and finally transferring an image on the substrate using a lithographic process, wherein the composition comprises a polymer having a weight average molecular weight of 500 to 30,000, a crosslinking agent, and additives (page 3, lines 55-56; [0066]-[0069]; claims 1 and 17). Takei et al. further disclose that the polymer is poly(p-vinylphenol), poly(styrene-co-p-vinylphenol), poly(methyl methacrylate-co-p-vinylphenol), poly(2-hydroxyethyl methacrylate-co-p-vinylphenol), poly(butyl acrylate-co-p-vinylphenol), or novolac type phenol resin (Example 6; claims 11 and 13-16). Thus, the present claims are anticipated by the disclosure of Takei et al.

7. Claims 1-2 and 4-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Meador et al. (US 5,919,599).

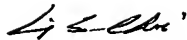
Meador et al. disclose a deep ultraviolet antireflective composition comprising (A) the reaction product of an acrylic polymer or copolymer and a deep ultraviolet light absorbing carboxylic acid or phenolic dye to produce a polymer or copolymer linked to the carboxylic acid or phenolic dye via a hydroxyester moiety or a hydroxyether moiety respectively, (B) a crosslinking agent, and (C) an acid catalyst (Fig. 1; claim 1). Thus, the present claims are anticipated by the disclosure of Meador et al.

### **Conclusion**

Art Unit: 1713

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling-Siu Choi whose telephone number is 571-272-1098.

If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reach on 571-272-1114.



LING-SUI CHOI  
PRIMARY EXAMINER

September 12, 2006